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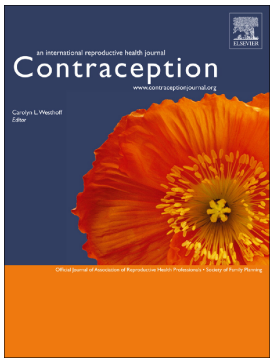

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PII: S0010-7824(18)30146-X
DOI: doi:10.1016/j.contraception.2018.04.010
Reference: CON 9092

To appear in:

Received date: 4 December 2016
Revised date: 12 April 2018
Accepted date: 15 April 2018

Please cite this article as: Patricia A. Lohr, John H. Parsons, Jeanette Taylor, Chelsea Morroni , Outcomes of dilation and evacuation with and without feticide by intra-cardiac potassium chloride injection: a service evaluation. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Con(2018), doi:10.1016/j.contraception.2018.04.010

Outcomes of dilation and evacuation with and without feticide by intra-cardiac potassium chloride injection: a service evaluation

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Funding: Society of Family Planning (Grant No, SFPRF6-6)

Conflicts of interest: None

Clinical trials registration: Not applicable

Abstract word count: 250

Manuscript word count: 3350

Keywords: feticide; potassium chloride; dilation and evacuation; D&E; abortion; second trimester

Short running title: D&E with and without feticide

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D&E with and without feticide

Abstract

Objective: To compare procedure duration, complications, and acceptability of dilation and evacuation (D&E) with and without feticide by intra-cardiac potassium chloride (KCL) injection.

Study design: We evaluated outcomes with D&E at 18-24 weeks' gestation in the 6 months before and 6 months after removing feticide with KCL from the guidelines of a national British abortion provider. We extracted demographic and procedure-related data from medical records and electronic databases. We surveyed women undergoing D&E in both time periods about acceptability and side effects.

Results: We analyzed 291 cases with and 257 cases without KCL. Unadjusted mean procedure duration was shorter with KCL than without (12.7 vs. 16.1 minutes, respectively, p<0.001). After adjustment for age, parity, Cesarean deliveries, gestational age, body mass index, surgeon, and number or duration of osmotic dilators used, KCL remained associated with a 3.5 minute (95% CI 2.4-4.6) reduction in D&E duration. Uterine atony was more common with KCL than without (3% vs. 0%, respectively, P<0.001), despite more frequent administration of prophylactic utero-tonics to women who received KCL (82% KCL vs. 73% no-KCL, p=0.001). Women who had KCL reported more pain in the period between feticide and dilator placement and the evacuation than women who had not received feticide (49% vs. 25%, respectively, p<0.001). Most women in both groups found their procedure very acceptable or acceptable (79% KCL vs. 87% no-KCL, p=0.2).

Conclusions: Feticide with intra-cardiac KCL reduced D&E procedure duration, but was associated with more pain and uterine atony. Treatment acceptability was high with and without feticide.

Implications: Inducing fetal demise before dilation and evacuation with intra-cardiac potassium chloride may result in shorter operative times but does not improve safety or acceptability. Level I evidence remains needed to support the use of feticide before surgical abortion.

Introduction

Fetal demise is induced before dilation and evacuation (D&E) by some abortion providers in the belief that it facilitates an easier, faster and safer evacuation [1]. Other frequently cited reasons for this practice are patient preference [2,3], avoiding prosecution [4], and avoiding extramural delivery with signs of life [1,5].

The most commonly used methods of inducing fetal demise before a D&E are intra-amniotic or intra-fetal injection of digoxin, and fetal intra-cardiac potassium chloride (KCL) injection [1]. Research is limited, but the few existing comparative studies suggest that these methods do not confer a clinical benefit and may increase risks. A randomized controlled trial of intra-amniotic digoxin injection found no reduction in D&E procedure duration, difficulty, or blood loss compared to placebo, but an increased risk of vomiting [2]. Extramural delivery, hospitalization, and signs of infection have also been reported as more frequent with digoxin use before D&E than with non-use [6]. The only comparative study of feticide with intra-cardiac KCL is a retrospective review of D&Es performed after KCL (n=23), without feticide (n=53), and for spontaneous fetal demise (n=52) [7]. Feticide with intra-cardiac KCL did not reduce anesthesia (operative) time or blood loss but was associated with a higher risk of cervical laceration. Although complications with the administration of fetal intra-cardiac KCL are rare [8, 9] chorioamnionitis has been reported with its use in the setting of selective fetal reduction [10] and one case report of maternal cardiac arrest due to inadvertent intravascular injection has been published [11].

British Pregnancy Advisory Service (BPAS) is a non-profit abortion provider with clinics in England, Scotland and Wales. The organization performs approximately 60,000 abortions annually of which over 1,800 are D&Es between 18 and 24 weeks' gestation. Since 2004, the BPAS guidelines have stipulated feticide with KCL as standard practice before surgical abortions performed at 22-23+6 weeks' gestation. In 2008, the criteria for feticide were expanded to also include pregnancies at 18-21+6 weeks' gestation when coupled with one

or more of the following characteristics: age ≤18 years, or body mass index (BMI) ≥33, or ≥2 Cesarean deliveries.

The BPAS Clinical Governance Committee reconsidered the inclusion of feticide in the organization's D&E guidance following the publication of research suggesting that the risks with feticide outweigh the benefits, and the conclusion in US guidelines [1, 12] that there is insufficient evidence to recommend feticide to increase the safety of D&E. The committee decided to remove feticide from the BPAS guidelines on D&E but wished to actively monitor the impact of this change in longstanding practice. This paper reports on the findings of that evaluation which spanned the 6 months prior to and the 6 months after the guideline changed.

Materials and methods

We conducted an evaluation at the three BPAS clinics in England where D&E with KCL was performed. To allow an even number of months for each cohort, we reviewed routinely collected data from all D&Es with KCL in the 6 months before its removal from organizational guidance and for all D&Es that would have met criteria for KCL in the 6 months after its removal. The criteria for feticide were 1) gestational age of 22-23+6 weeks, or 2) gestational age of 18-21+6 weeks combined with one or more of the following characteristics: age ≤18 years, or body mass index (BMI) ≥33, or ≥2 Cesarean deliveries. The nurse undertaking the abortion consultation provided women with written and verbal information about the evaluation and obtained consent for the treatment to be provided. All BPAS clients receive written information about how their anonymized data may be accessed for use, including service evaluations and research.

D&E with and without feticide

From February-July 2014, a fetal intra-cardiac KCL injection followed by insertion of osmotic cervical dilators was performed the day prior to evacuation (Day 1). Using ultrasound, the surgeon confirmed correct placement of a 16-cm 17-gauge Chiba needle (Cook Ob/Gyn, IN, USA) in the fetal ventricle and injected 1-3 ml of a 15% KCL solution. If asystole was not observed, the surgeon gave further doses of KCL. Immediately after the injection, the surgeon inserted Dilapan osmotic cervical dilators (4mm x 65mm). The number of dilators to be inserted was not stipulated in BPAS' guidance. Antibiotic prophylaxis with azithromycin one gram orally once or doxycycline 100 mg orally twice per day for seven days was administered following feticide and dilator insertion [5].

Women were discharged and returned the next day for evacuation (Day 2). Adjunctive misoprostol was administered after admission to the clinic. The recommended regime for adjunctive misoprostol was misoprostol 400 mcg vaginally for 3 hours or sublingually for 2 hours. In cases of inadequate dilation, women received additional doses of misoprostol and/or osmotic dilators for 3 more hours. If the surgeon determined the dilation was insufficient to safely complete the procedure, additional dilators were placed for another 24 hours and the evacuation performed on Day 3.

Evacuations were undertaken under general anesthesia with propofol and fentanyl, without intubation. Additional antibiotic prophylaxis with metronidazole one gram per rectum was administered immediately post-operatively [5]. The use of prophylactic or indicated utero-tonics was left to the discretion of the surgeon. Eight experienced providers performed all procedures, of which six performed most of the evacuations across both time periods; one provider performed 3 procedures with KCL and none without KCL and one performed 3 procedures without KCL and none with KCL.

D&E with and without feticide

From August 2014-January 2015, the use of feticide was removed from organizational D&E guidelines. Those women who would have previously met criteria for feticide had Dilapan placed on Day 1 while awake. Cervical anesthesia was not used for insertion. All other procedures were performed as described.

We extracted demographic data and data on procedures and complications from the case note onto a data collection form. Procedure start and end times were recorded by a health care assistant from a clock in the theater and reflect the time from the first instrument inserted into the vagina to the last instrument removed from the vagina. The times were recorded in hours and minutes. A nurse administered surveys about nausea, vomiting, pain, and cramping between feticide and/or dilator placement and the evacuation, and asked women to rank the severity and/or frequency of their symptoms. Women were also asked to rank the acceptability of the procedure they underwent (feticide and Dilapan insertion or Dilapan insertion alone) using a 5-point Likert scale. The nurse aimed to survey clients prior to the evacuation but in some cases the surveys were performed after the evacuation.

The primary outcomes were the duration of the D&E and 'any complication'. Complications were limited to those occurring at the time of the procedure. Complications were reported by the surgeon or a member of the theater team on incident reporting forms and coded using the organization's existing codes for incidents. The codes also indicated if the complication was major or minor. Major complications were: uterine perforation, hemorrhage (estimated blood loss ≥ 500 ml) requiring transfusion, uterine atony requiring more than one dose of utero-tonic medication or an additional intervention (e.g., uterine massage) or both, infection requiring hospitalization, exploratory laparoscopy or laparotomy, hysterectomy, pulmonary aspiration, adverse drug reaction requiring hospitalization, extramural delivery, and failed procedure. Minor complications were: cervical false passage, cervical laceration requiring

repair, hemorrhage not requiring transfusion, uterine atony not requiring more than one dose of uterotonic medication or additional intervention, incomplete abortion, hematometra, infection not requiring hospitalization, vasovagal reaction, and adverse drug reaction not requiring hospitalization.

We generated descriptive statistics overall and by group (KCL and no-KCL). We used Chi-square, Fisher's Exact, Student's t, Wilcoxon rank sum, and Anova tests to assess differences by group in bivariate analyses. We used multivariable linear regression to assess the relationship between procedure duration and KCL, adjusted for other variables. We defined statistical significance as a two-tailed p-value of ≤0.05. Data were analyzed using STATA Statistical Software, release 13.0 (Stata-Corp., College Station, TX).

This project was approved by BPAS' Research and Ethics Committee (Ref. 2014/01/PL).

Results

Five-hundred forty-eight women were involved in the evaluation: 291 (53.1%) received feticide with KCL before their D&E and 257 (46.9%) did not receive feticide. Demographic characteristics, obstetrical history, body mass index (BMI), and gestational age were not different between groups (Table 1). Most women were nulliparous (66.6%). Of those who were parous, 19.1% (n=36) had one or more prior Cesarean deliveries (18 per group). The mean gestational age in both groups was 22 weeks and 2 days. All but two of the pregnancies were singleton gestations.

We excluded five women from the analysis of outcomes. Three women in the KCL group did not return to the clinic for evacuation. In two cases, the women informed the clinic staff that

they were unable to arrange or afford transportation. One of them presented to a local hospital two days later and delivered spontaneously. An induction of labor in a local hospital was organized for the second woman. In the third case, clinic staff members were unable to contact the woman to ascertain her reasons for not returning. The clinic was then contacted by a hospital consultant several weeks later when she presented in labor and delivered the demised fetus. Two women in the no-KCL group did not progress to a surgical evacuation. One chose to continue the pregnancy and had the Dilapan removed. The other was deemed unsuitable for general anesthesia on Day 2 because of a chest infection. She had a medical induction in hospital.

Procedure details are summarized in Table 2. Feticide with intra-cardiac KCL was administered under general anesthesia with propofol and fentanyl without intubation in 98% of cases. Local anesthesia was used in the remaining 2%. The mean volume of KCL administered was 6.2 ml (range 1.5-10 ml) and median length of time to complete the feticidal procedure and insert Dilapan was 8 minutes (range 5-28 minutes). Cervical preparation was undertaken with Dilapan in all cases, but fewer were placed when KCL was used. When KCL was administered, 0.3% (n=1) of women had 2 Dilapan inserted, 93.8% (n=273) received 3 Dilapan, and 5.8% (n=17) had 4 or more placed. In the period when KCL was omitted, 1.6% (n=4) had 2 Dilapan, 57.2% (n=147) had 3, and 41.2% (n=106) had 4 or more inserted. The duration of time that the Dilapan were left in situ was shorter with KCL than without KCL (mean 22.8 vs. 24.1 hours, respectively, $p<0.001$). Adjunctive misoprostol was used in 99% (n=287) of women in the KCL group and 100% in the no-KCL group ($p=0.1$). Most women (98.7%) received misoprostol 400 mcg vaginally for 3 hours (62.0%) or sublingually for 2 hours (36.5%) pre-operatively. There was no significant difference in the dose, route or duration of adjunctive misoprostol between groups. There was no difference between groups in the number of women who required an additional set of Dilapan (3 KCL vs. 1 no-KCL, $p=0.4$), additional misoprostol (3 KCL vs. 3 no-KCL, $p=0.8$), Dilapan insertion

over two days (2 KCL vs. 0 no-KCL, p=0.5), or need for additional dilation intra-operatively (21 KCL vs. 17 no-KCL, p=0.5). The proportion of procedures with and without KCL and total number of procedures performed was similar across the clinical sites. Each surgeon performed similar proportions of procedures with and without KCL.

Mean procedure duration was significantly shorter in the KCL group compared to the no-KCL group (12.7 vs. 16.1 minutes, p<0.001). Median procedure duration was 11 minutes (range: 3-34) with KCL and 15 minutes (range: 5-56) without KCL (p<0.001). Other variables significantly associated with a reduction in procedure duration in bivariate analyses were surgeon, gestational age less than 22 weeks', and a greater number of Dilapan placed (all p<0.001; data not shown). Factors not associated with a reduction in procedure duration in bivariate analysis were age, parity, prior Cesarean deliveries, BMI or duration of Dilapan in situ (data not shown). In multivariable linear regression (Table 3), KCL was independently associated with a decrease in procedure duration of 3.5 minutes (95% CI 2.4-4.6). Other variables of interest significantly associated with a reduction in procedure duration were longer duration of Dilapan in situ, lower gestational age, and fewer Caesarean deliveries. Age, parity, BMI, and number of Dilapan were not associated with procedure duration.

There was no significant difference in overall complications between groups (7.3% KCL vs. 4.3% no-KCL, p=0.1) (Table 4). Five women had major complications in the KCL group compared to 4 in the no-KCL group (1.7% vs. 1.6%, respectively, p=0.9). In the KCL group, these were 3 extramural deliveries following administration of adjunctive misoprostol, one case of major atony, and one hemorrhage resulting in disseminated intravascular coagulopathy, hysterectomy and uterine artery embolization in a woman with abnormal placentation. In the no-KCL group, major complications were two extramural deliveries, one case of major atony, and two failed procedures. In one of the procedure failures, the cervix

was displaced due to fecal impaction and could not be reached by the surgeon. The client had a medical induction. In the other failed procedure, the surgeon was only able to partially complete the evacuation due to high and transverse fetal lie. Misoprostol and oxytocin were administered to bring the fetal parts into the lower part of uterus to facilitate extraction. An extramural delivery followed shortly after their initiation. The other extramural delivery occurred in the clinic after placement of a second set of Dilapan.

Total minor complications were not significantly different between groups (5.6% KCL vs. 3.1% no-KCL, p=0.2). However, there were significantly more cases of minor atony with KCL than without KCL (3.1% vs. 0%, respectively, p=0.004). This was despite appreciably more women in the KCL group receiving prophylactic utero-tonics (81.6% KCL vs. 72.6% no-KCL, p=0.01). There was no difference in hemorrhage or need for transfusion between groups. More women in the no-KCL group had cervical lacerations requiring repair, but this was not significant (2.8% no-KCL vs. 0.7% KCL, p=0.06, OR 4.0, 95% CI 0.8-19.7). Neither KCL nor any of the other variables of interest (i.e., clinic, surgeon, age, BMI, prior Cesareans, gestational age, or number or duration of Dilapan in situ) were associated with “any complication” in bivariate analysis (data not shown).

Information about side effects and acceptability was provided by 538 women (Table 5). In 92.5% of cases (n=481), feedback was received just prior to the evacuation and in 7.5% (n=39) after the evacuation. More women who received KCL reported nausea than women who did not have KCL (31.0% vs. 18.5%, respectively, p=0.001). Most women in the KCL group who had nausea reported it as mild (64.2%). Vomiting was not different between groups (18.8% KCL vs. 18.5% no-KCL, p=0.9). Pain was more frequently reported by women who had undergone feticide (49% KCL vs. 24.5% no-KCL, p=<0.001), mainly at the KCL injection site. There was no difference in cramping overnight (55.9% KCL vs. 59.7% no-

KCL, p=0.4). The proportion of women who rated their procedure as acceptable or very acceptable did not differ between groups (79.4% KCL vs. 87.0% no-KCL, p=0.2). The overall pattern of responses for side effects remained the same overall and stratified by timing of survey. Reported levels of nausea, vomiting, and pain were higher in the KCL group when the surveys were performed post-procedure but these were not statistically significantly different due to the small numbers of surveys done at this time.

Discussion

In this comparative service evaluation, we found that injection of fetal intra-cardiac KCL prior to D&E at 18-24 weeks' gestation was associated with a reduction in procedure duration of 3.5 minutes (95% CI 2.4-4.6) after adjustment for age, parity, Cesarean deliveries, gestation, BMI, surgeon, and number and duration of Dilapan in situ. Feticide with KCL was also associated with more reported nausea, pain at the injection site, and uterine atony. The KCL-associated reduction in procedure duration we observed was independent of other factors that also led to modest duration reductions (i.e., longer duration of Dilapan in situ) or of those that increased procedure duration (i.e., more Cesareans, greater gestational age).

These findings contrast with those of Jackson et. al, [2] who found no difference in procedure duration between intra-amniotic digoxin and a placebo injection, even within subgroupings by gestation, surgeon and parity. One potential explanation for this difference in findings is that the duration of fetal demise, and opportunity for subsequent softening of the fetal tissues and cervical ripening, is longer with KCL than digoxin. Potassium chloride induces asystole immediately compared to intra-amniotic digoxin, which can take 4 hours or more to cause fetal demise [13]. Intra-amniotic digoxin may also fail to induce demise in up to 8% of cases [1]. This may not be comparable when digoxin is administered intra-fetally, including into the fetal heart, however, which may lead to faster and/or immediate induction of demise. Alternatively it may be that the intense vasoconstriction known to be induced by

high concentrations of KCL directly damages fetal tissues accelerating autolysis which facilitates the evacuation.

Our findings also differ from those in the small retrospective analysis by Singh et. al, [7] who found no reduction in procedure times when comparing D&Es with and without KCL or spontaneous demise One possible explanation for the increased operative time without KCL that we observed is that the surgeons, who had been performing D&E with KCL for many years, were unaccustomed to the feel of fetal tissue at advanced gestations without KCL. It is possible that, with time, their operative times would have decreased as they became used to approaching the cases in a way suited to less fetal maceration.

Complications were infrequent, and we found no difference in the overall number of cases with any complication, or in major or minor subgroupings with and without KCL. Neither extramural deliveries nor infection were higher with KCL than without KCL. Uterine atony requiring massage or administration of a single utero-tonic agent was significantly more common with KCL, despite more women in this group receiving prophylactic utero-tonics. We are uncertain as to the reason for this finding. Although atony can be a very serious complication, there was no difference between groups in atony needing multiple interventions, hemorrhage or blood transfusions, potentially due to prophylactic interventions.

We documented that women receiving KCL reported more nausea. This side effect was most likely due to the fentanyl administered as part of the general anesthesia regimen used for the feticidal injection. Feticide with intra-cardiac KCL can be administered with local anesthesia [8], which may have reduced this side effect as well as the injection site pain that

women reported. It is also notable that in all cases, the duration of time necessary to perform the feticidal injection exceeded the observed reduction in D&E procedure duration in all cases. Despite differences in discomfort and substantial differences in process, overall acceptability of treatment was high in both, and not different between, groups.

The main limitation of this evaluation is that it was not a randomized trial. We are, therefore, unable to state conclusively that KCL would influence outcomes with D&E differently from not using KCL if women were allocated at random. Although not randomized, we benefitted from a large sample and the groups were very similar, and particularly with regard to characteristics such as gestational age, multiple prior Cesareans and higher BMI, which have been shown to affect procedure duration or complications in other studies of D&E [16, 17, 18]. In addition, procedural variations introduced by surgeons when KCL was removed from organizational guidelines, such as using more Dilapan and leaving them in place longer, did not reduce procedure duration to the same degree as KCL administration. This suggests that the observed effect of KCL might have been greater had those variations not been introduced.

In conclusion, we found that feticide with intra-cardiac KCL is associated with a reduction in D&E procedure duration but with more reported pain, mainly at the injection site, and an increased occurrence of uterine atony. A randomized trial is necessary to confirm these results. Even if a reduction in D&E duration is demonstrable in a trial, this additional efficiency at the time of evacuation needs to be weighed against the need to provide advanced training to clinicians in safe and effective ultra-sound guided intra-fetal intra-cardiac injections, risks associated with the injection including those of sedation or general anesthesia if needed for administration, and the time necessary to perform the feticide injection.

D&E with and without feticide

Acknowledgements

We would like to thank the clients, staff and surgeons involved in this evaluation, and particularly note the contributions of Vanessa Sangala, Bobbie Farsides, and those unit staff who assisted with data collection in London: Sandy Hackett, Sally Sagoo, Jay MnKandla, Shelley Quarcoo, Grace Ramnath and Natasha Kidd.

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D&E with and without feticide

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Table 1. Baseline characteristics of women who underwent dilation and evacuation with and without feticide with potassium chloride (KCL) from February 2014-January 2015 at British Pregnancy Advisory Service (N=548)

Characteristic	**KCL* (n=291)**	**No-KCL** (n=257)**	***p-value***
Demographics			
Age in years	22.4 ± 6.8	22.8 ± 6.8	0.7
Age range	11-46	13-44	
Ethnicity			0.5
White	242 (82.9)	204 (79.7)	
Mixed	12 (4.1)	10 (3.9)	
Asian/Asian British	16 (5.5)	14 (5.5)	
Black/Black British	19 (6.5)	26 (10.2)	
Chinese/Other	2 (0.7)	0	
Missing data	1 (0.3)	2 (0.8)	
Relationship status			0.6
Single	140 (48.1)	110 (42.9)	
Partnered, not married	115 (39.5)	109 (42.4)	
Married	25 (8.6)	23 (8.6)	
Divorced/separated/widowed	8 (2.8)	9 (3.5)	
Did not disclose	3 (1.0)	6 (2.3)	
Body Mass Index (kg/m^2)* **			
≤33	275 (94.5)	242 (94.1)	0.9
>33	16 (5.5)	15 (5.8)	
Reproductive History			
Parity			0.4
0	199 (68.2)	166 (64.8)	
1+	93 (31.9)	90 (35.2)	
Vaginal deliveries			0.4
0	214 (73.5)	180 (70.0)	
1+	77 (26.5)	77 (30.0)	
Caesarean deliveries			0.9
1	8 (2.8)	11 (4.3)	
2+	10 (3.4)	7 (3.9)	
Prior abortion	55 (18.9)	52 (20.2)	0.2
Current Pregnancy			
Gestational age in weeks + days	22+2 ± 1+3	22+2 ± 1+4	0.9
Gestational age range	18+0-24+0	17+0-23+6	
Gestation			0.2
Singleton	289 (99.3)	257 (100)	
Twin	2 (0.7)	0	

Data presented as n (%) or mean ± standard deviation, unless otherwise noted

* KCL = feticide with intra-cardiac potassium chloride
** No-KCL= no feticide
***Indications for feticide from 18+0 and 21+6 weeks' gestation include BMI over 33 kg/m^2

Table 2. Details of feticidal and dilation and evacuation procedures performed with and without feticide with potassium chloride (KCL) from February 2014-January 2015 at British Pregnancy Advisory Service (N=548)

	KCL* N=291	**No KCL** N=257**	**p-value**
Distribution of feticidal procedures by clinical site			
1	93 (31.9)	-	-
2	106 (36.4)	-	-
3	92 (31.6)	-	-
Distribution of feticidal procedures by surgeon			
1	49 (16.8)	-	-
2	21 (7.2)	-	-
3	83 (28.5)	-	-
5	26 (8.9)	-	-
7	87 (29.9)	-	-
9	24 (8.3)	-	-
10	1 (0.3)	-	
Feticide anesthesia			
General	285 (97.9)	-	-
Local	6 (2.1)	-	-
KCL dose in ml	6.2 ± 2.7	-	-
KCL dose range	1.5-10		
Median feticide procedure duration in minutes (range)	8 (5-28)	-	-
Cervical preparation			
Number of Dilapan placed (first set)			<0.001
2	1 (0.3)	4 (1.6)	
3	273 (93.8)	147 (57.2)	
4+	17 (5.8)	106 (41.2)	
Number Dilapan (first set) by gestational age group			
<22 weeks' gestation	3.0 ± 0.3	3.4 ± 0.6	<0.001
≥ 22 weeks' gestation	3.1 ± 0.4	3.5 ± 0.7	<0.001
Adjunctive misoprostol			0.3
Yes	287 (99.6)	255 (100)	
No	1 (0.4)	0	
Adjunctive misoprostol dose (mcg)			0.2
400	285 (99.3)	255 (100)	
600	2 (0.7)	0	
Adjunctive misoprostol route			0.2
Vaginal	189 (65.9)	150 (58.8)	
Oral	1 (0.4)	2 (0.8)	
Sublingual	97 (33.8)	103 (40.4)	
Length of time misoprostol to procedure in hours	3.4 ± 2.6	3.1 ± 0.8	0.06
Duration Dilapan in situ (first set)	22.9 ± 3.6	24.1 ± 2.2	<0.001

D&E with and without feticide

Number receiving second set of Dilapan	3 (1.0)	1 (0.4)	0.4
Number receiving second dose of misoprostol	3 (1.0)	3 (1.2)	0.8
Mechanical dilatation required			0.8
Yes	21 (7.3)	17 (6.7)	
No	262 (91.0)	235 (92.2)	
Not documented	5 (1.7)	3 (1.2)	
Distribution of evacuations by clinical site			0.6
1	92 (31.9)	90 (35.3)	
2	103 (35.8)	92 (36.1)	
3	93 (32.3)	73 (28.6)	
Distribution of evacuations by surgeon[§]			<0.001
1	51 (17.7)	41 (16.1)	
2	3 (1.0)	13 (5.1)	
3	96 (33.3)	79 (31.0)	
4	49 (17.0)	38 (14.9)	
5	75 (26.0)	52 (20.4)	
6	11 (3.8)	29 (11.4)	
7	3 (1.0)	0	
8	0	3 (1.2)	
Evacuation duration in minutes	12.7 ± 5.0	16.1 ± 7.9	<0.001
Median evacuation duration in minutes (IQR) (range)	11 (10-15) (3-34)	15 (11-19) (5-56)	<0.001

Data presented as n (%) or mean ± standard deviation, unless otherwise noted

* KCL = feticide with intra-cardiac potassium chloride
** No-KCL= no feticide
[§]n=288 for KCL group as three women did not return to BPAS for the evacuation, n=255 for no-KCL group as two women did not progress to surgical evacuation

Table 3. Multivariable linear regression of variables associated with dilation and evacuation procedure duration in women who underwent dilation and evacuation with and without feticide with potassium chloride (KCL) from February 2014-January 2015 at British Pregnancy Advisory Service (N=543)

Variable of interest	**Effect on procedure duration in minutes**	**95% Confidence Interval**	***p-value***
KCL* vs. no-KCL**	-3.49	-4.61, -2.37	<0.001
Age > 18 years vs. ≤ 18 years	-1.21	-2.46, 0.03	0.06
BMI*** ≥ 33 kg/m^2 vs. < 33 kg/m^2	0.11	-2.13, 2.35	0.92
Parous vs. Nulliparous	-0.60	-1.83, 0.64	0.34
Gestational age < 22 vs. ≥ 22 weeks	-4.60	-5.85, -3.35	<0.001
Prior Cesarean delivery ≤ 1 vs. ≥ 2	-4.21	-7.28, -1.15	0.007
Increased time Dilapan in situ (continuous variable in hours)	-0.28	-0.50, -0.07	0.01
Increased number Dilapan in situ (continuous variable)	0.79	-0.12, 1.69	0.09
Surgeon performing evacuation			
1	Reference	-	-
2	-2.94	-6.02, 0.14	0.06
3	-2.38	-3.89, -0.87	0.002
5	-6.19	-7.91, -4.47	<0.001
6	-6.21	-7.86, -4.58	<0.001
7	-4.22	-6.45, -1.98	<0.001
9	-6.35	-13, 0.30	0.06
10	-0.79	-7.47, 5.89	0.82

* KCL = feticide with intra-cardiac potassium chloride
** No-KCL= no feticide
*** BMI =Body Mass Index

Table 4: Overall, major and minor complications in women who underwent dilation and evacuation with and without feticide with potassium chloride (KCL) from February 2014-January 2015 at British Pregnancy Advisory Service (N=543)

	KCL* (N=288)	**No-KCL** (N=255)**	***p-value***
Procedures with any complication	21 (7.3)	11 (4.3)	0.1
Major complications	5 (1.7)	4 (1.6)	0.9
Extramural delivery	3 (1.0)	2 (0.8)	0.7
Major atony***	1 (0.3)	1 (0.4)	0.9
Hemorrhage[¥] requiring transfusion	1 (0.4)	0	0.3
Failed procedure	0	2 (0.8)	0.1
Disseminated intravascular coagulopathy	1 (0.4)	0	0.3
Minor complications	16 (5.6)	8 (3.1)	0.2
Cervical laceration requiring repair	2 (0.7)	7 (2.8)	0.06
Adverse drug reaction	1 (0.4)	0	0.3
Minor atony[§]	9 (3.1)	0	0.004
Hemorrhage not requiring transfusion	4 (1.4)	2 (0.8)	0.5

* KCL = feticide with intra-cardiac potassium chloride

** No-KCL= no feticide

*** Requiring more than one dose of utero-tonic medication or an additional intervention or both

[¥]Hemorrhage defined as estimated blood loss ≥ 500 ml

[§]Not requiring more than one dose of uterotonic medication or additional intervention

Table 5. Reported overnight side effects and acceptability of procedure in women who underwent dilation and evacuation with and without feticide with potassium chloride (KCL) from February 2014-January 2015 at British Pregnancy Advisory Service (N=538)

	KCL* (n=286)	**No-KCL** (n=252)**	***p-value***
Any nausea	81 (31.0)	43 (18.5)	0.001
Nausea rating			0.1
Mild	52 (64.2)	21 (48.8)	
Moderate	20 (24.7)	18 (41.9)	
Severe	9 (11.1)	4 (9.3)	
Any vomiting	49 (18.8)	43 (18.5)	0.9
Number of vomiting episodes	2 (1-10)	2.4 (1-12)	0.4
Vomiting rating			0.007
Mild	29 (59.2)	17 (39.5)	
Moderate	11 (22.5)	23 (53.5)	
Severe	9 (18.4)	3 (6.9)	
Any pain	128 (49.0)	57 (24.5)	<0.001
Pain rating			0.3
Mild	72 (56.3)	29 (50.9)	
Moderate	47 (36.7)	20 (35.1)	
Severe	9 (7.0)	8 (14.0)	
Any cramping	146 (55.9)	139 (59.7)	0.4
Cramping rating			0.9
Mild	104 (72.2)	98 (70.5)	
Moderate	33 (22.9)	35 (25.2)	
Severe	7 (4.9)	6 (4.3)	
How acceptable did you find the procedure?			0.2
Very acceptable	34 (14.3)	33 (14.3)	
Acceptable	155 (65.1)	168 (72.7)	
Neither acceptable nor unacceptable	40 (16.8)	25 (10.8)	
Unacceptable	8 (3.4)	5 (2.7)	
Very unacceptable	1 (0.4)	0	

* KCL = feticide with intra-cardiac potassium chloride
** No-KCL= no feticide